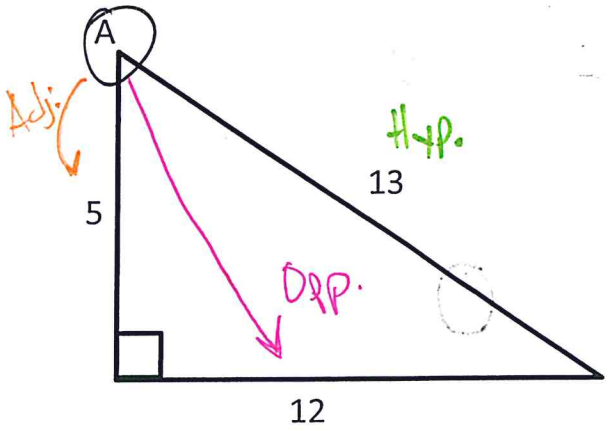
Finding Missing Angles in Right Triangles

What trig ratios can we set up for angle A?



$\sin A = \frac{12}{13}$ $\quad S = \frac{O}{H}$

$\cos A = \frac{5}{13}$ $\quad C = \frac{A}{H}$

$\tan A = \frac{12}{5}$ $\quad T = \frac{O}{A}$

What is the measure of <A? ?

When solving for a variable in an equation, we use inverse (opposite) operations to get the variable by itself.

Examples:

$x + 4 = 6$

$-4 \quad -4$

$x = 2$

$\frac{3x}{3} = \frac{15}{3}$

$x = 5$

$(\sqrt{x})^2 = (7)^2$

$x = 49$

Trig. functions also have inverses.

Examples: Find the measure of each angle (round to the nearest tenth):

$\sin X = 0.829$

* To use trig inverse, switch decimal/fraction & variable.

$\sin^{-1}(.829) = X$ ← inverse sine

Plug into calc.

$X = 56°$

$\cos Y = 0.743$

$\cos^{-1}(.743) = Y$

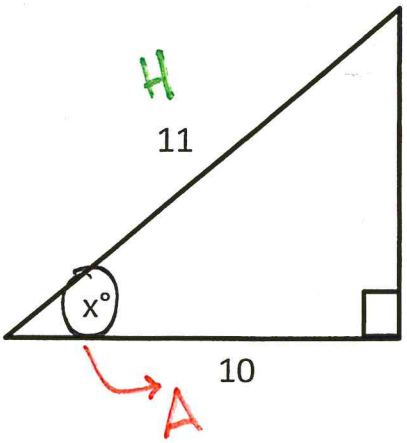
$Y = 42°$

$\tan A = 4.705$

$\tan^{-1}(4.705) = A$

$A = 78°$

Solve for x in each triangle (round to the nearest tenth):



Which sides? (O/A/H)

Function? SOH CAH TOA

$\cos x = \frac{A}{H}$

Setup:

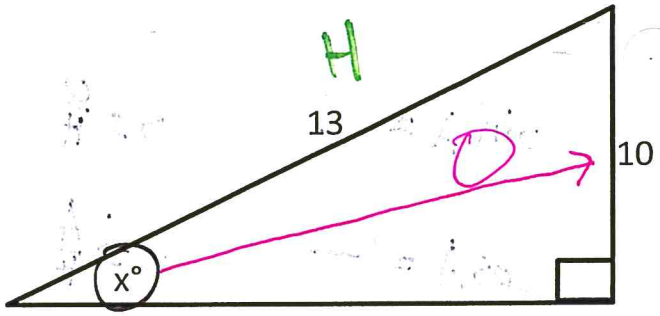
$\cos x = \frac{10}{11}$

Solve:

$\cos^{-1}\left(\frac{10}{11}\right) = x$

Plug into calc.

$x = 24.6°$



Which sides? (O/A/H)

Function? SOH CAH TOA

$\sin x = \frac{O}{H}$

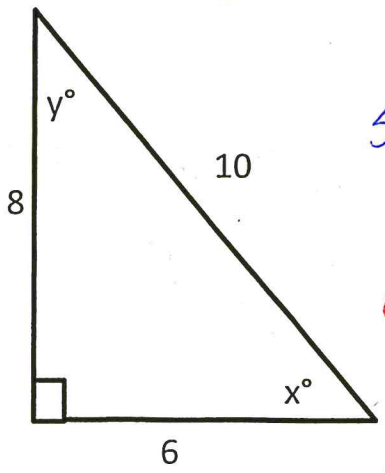
Setup:

$\sin x = \frac{10}{13}$

Solve:

$\sin^{-1}\left(\frac{10}{13}\right) = x$

$x = 50.3°$



X

$\sin x = \frac{8}{10}$

$\hookrightarrow \sin^{-1}\left(\frac{8}{10}\right) = x$

$\cos x = \frac{6}{10}$

$\hookrightarrow \cos^{-1}\left(\frac{6}{10}\right) = x$

$\tan x = \frac{8}{6}$

$\hookrightarrow \tan^{-1}\left(\frac{8}{6}\right) = x$

$x = 53.1°$

Y

$\sin y = \frac{6}{10}$

$\hookrightarrow \sin^{-1}\left(\frac{6}{10}\right) = y$

$\cos y = \frac{8}{10}$

$\hookrightarrow \cos^{-1}\left(\frac{8}{10}\right) = y$

$\tan y = \frac{6}{8}$

$\hookrightarrow \tan^{-1}\left(\frac{6}{8}\right) = y$

$y = 36.9°$